



## **Mocean Energy Orkney M100P Test 2023/2024**

### **Project-specific Environmental Management Plan (PEMP)**

**Final**

**Issued by Mocean Energy**

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Members of:



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# 1 INTRODUCTION

## 1.1 BACKGROUND

Mocean Energy, based in Edinburgh, is developing wave energy converters (WECs) for various applications from small-scale off-grid use to large, utility-scale projects. Its core technology is its hinged raft WEC, which consists of two hulls with novel shapes connected by a single hinge. Wave forcing, and the hulls' dynamics cause a rotation about the hinge, which is converted to electricity via a power take-off system.

The RSP system is an offshore renewable power source that charges batteries to supply power and comms to subsea equipment, and it consists of:

- Blue X: wave energy converter (WEC) – Mocean Energy (also referred to as M100P)
- Halo: Subsea battery storage and energy management – Verlume
- Subsea electronics Module (SEM) – Baker Hughes.
- ARV-I and a docking station: Autonomous Underwater Vehicle (AUV): Transmark Subsea.

An umbilical connects Blue X with the Halo, however, the device will not be connected to a subsea cable to provide power onshore. This is a demonstration project.

Testing is planned to be undertaken in an area to the East and offshore of Deerness, Orkney in 2023/2024. The primary purpose of testing is to gather performance data and learnings from deployment of the RSP system in order to inform further development of the system's designs and interfaces.

This Project Environmental Management Plan (PEMP) has been produced to support a Marine Licence application under Part 4, Section 54 of the Marine (Scotland) Act 2010 for this deployment.

Table 4 presents the results from the environmental assessment of the Project; a process which draws together, in a systematic way, an assessment of a project's likely significant environmental effects. This helps to ensure that the importance of the predicted effects, and the scope for reducing any adverse effects through mitigation, are fully understood by the public and the competent authority.

## 1.2 CONTENTS OF THE PEMP

The PEMP details the proposed mitigation, monitoring and management measures for all stages of the project including installation/construction, operation and maintenance (O&M) and decommissioning of the device.

Mocean Energy are committed to updating and improving this PEMP through consultation and as more data, information and experience is gathered. In addition, they are committed to working closely with stakeholders and other developers to ensure that all mitigation and monitoring activities are conducted in line with best practice and best available knowledge at all times. Mocean Energy will also strive to actively engage with other developers and stakeholders to address the key issues and uncertainties associated with wave energy development through targeted research initiatives.



## 2 CONSTRUCTION METHOD STATEMENT

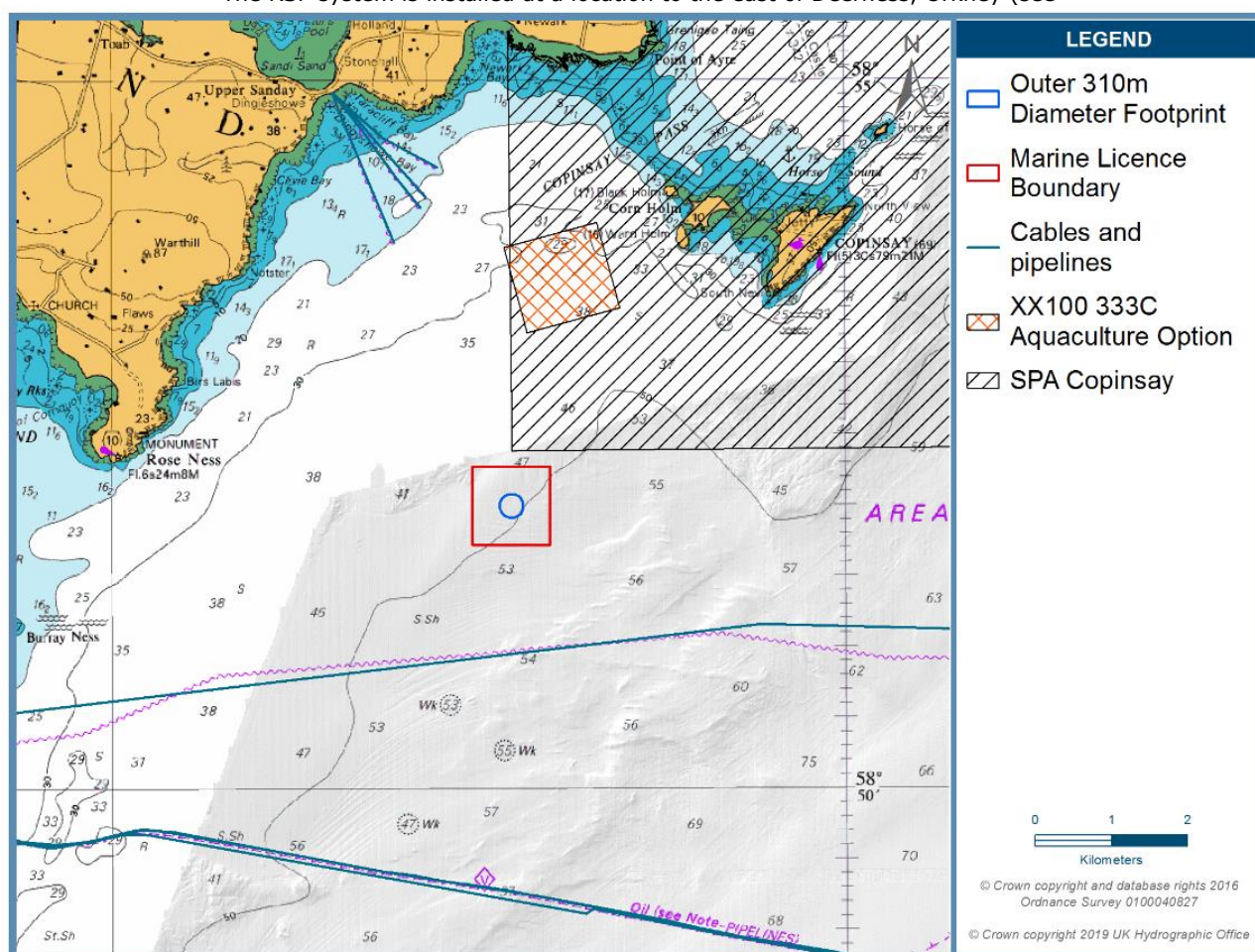
### 2.1 PROJECT OVERVIEW

The following activities are proposed:

- Construction and installation;
- Operation and maintenance; and
- Decommissioning/final removal of all equipment.

### 2.2 PROJECT LOCATION

The RSP system is installed at a location to the east of Deerness, Orkney (see



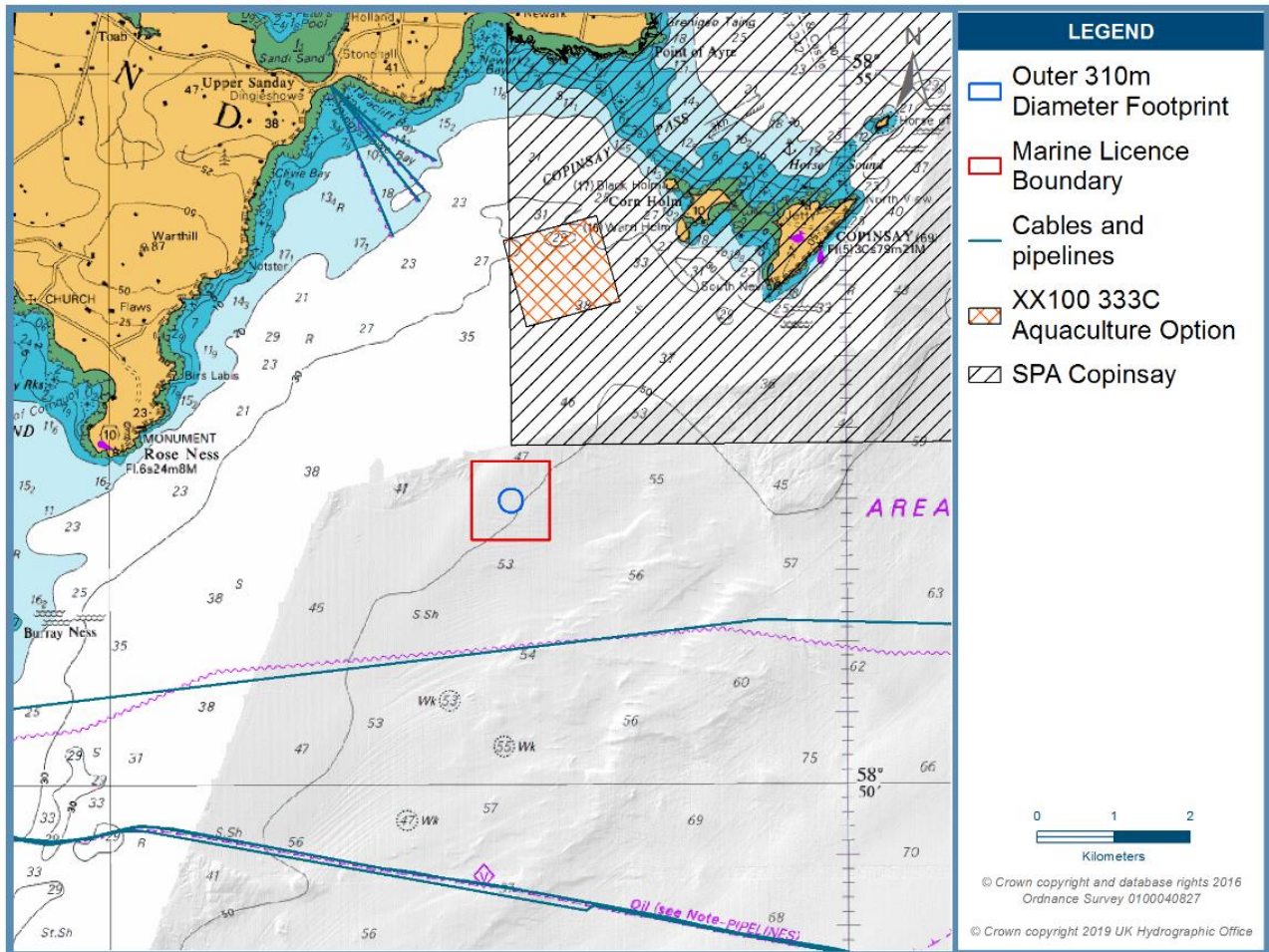
**Figure 2-1).** The licence boundary required for installation of the device is specified in Table 1. The precise location of the device and anchors (within the licence boundary provided) has been submitted to Marine Scotland Licensing Operations Team (MS-LOT) and other authorities (MCA, UKHO,NLB) as requested under the marine licence conditions.

**Table 1 Coordinates of licence boundary**

Point	Longitude	Latitude
NW	-2.75142	58.8711



NE	-2.75148	58.86194
SE	-2.7338	58.8619
SW	-2.73373	58.87106



**Figure 2-1 Proposed licence and deployment area at Test Site**

## 2.3 PROJECT SCHEDULE, TIMINGS AND COMMENCEMENT DATES

The proposed installation, operations, maintenance and decommissioning schedule (indicative) for the Project is shown in Appendix A. The installation of the RSP system and its associated mooring system was completed on the 28th February 2023. The extended operational period of the test is anticipated to last up to the end of March 2024. To allow some contingency in the programme, the marine licence application will cover the period until (and including) September 2024. Thereafter, taking into consideration the 3 month recovery condition on the current licence 10107 all equipment is planned to be completely removed from site by the 30th June 2024.

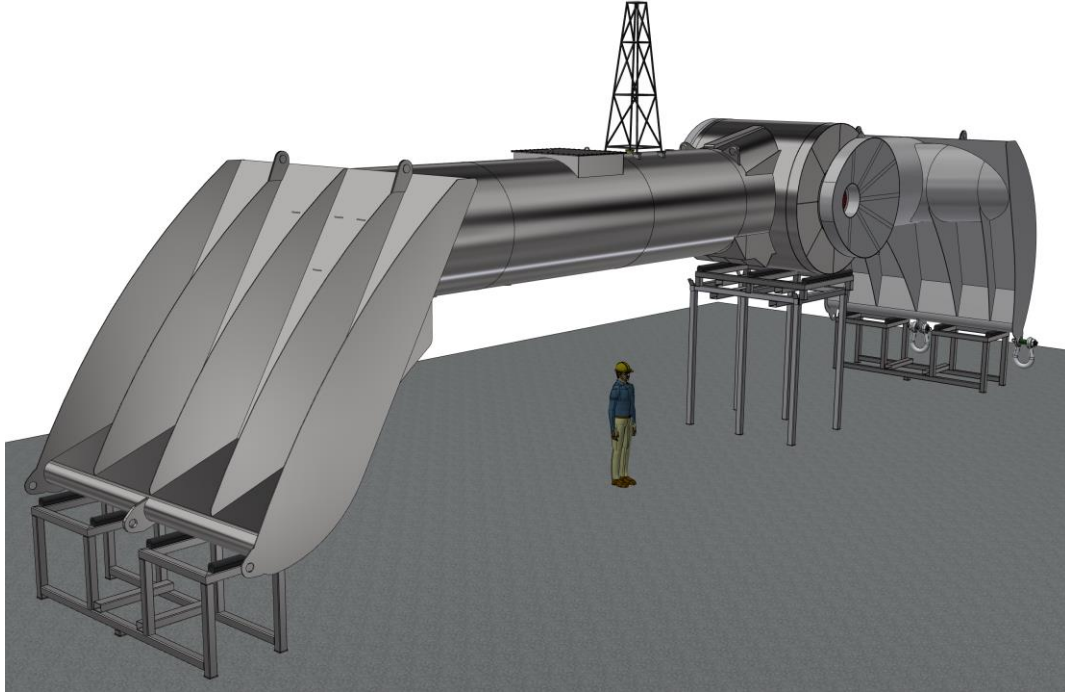
At all times, onsite works will be subject to Mocean Energy's HSE Plan and Mocean Energy's Operations Plan, which are managed by Mocean Energy to minimise any potential conflicts and maximise any opportunities that may arise.



## 2.4 TECHNICAL DESCRIPTION OF COMPONENTS

### Hull Structure

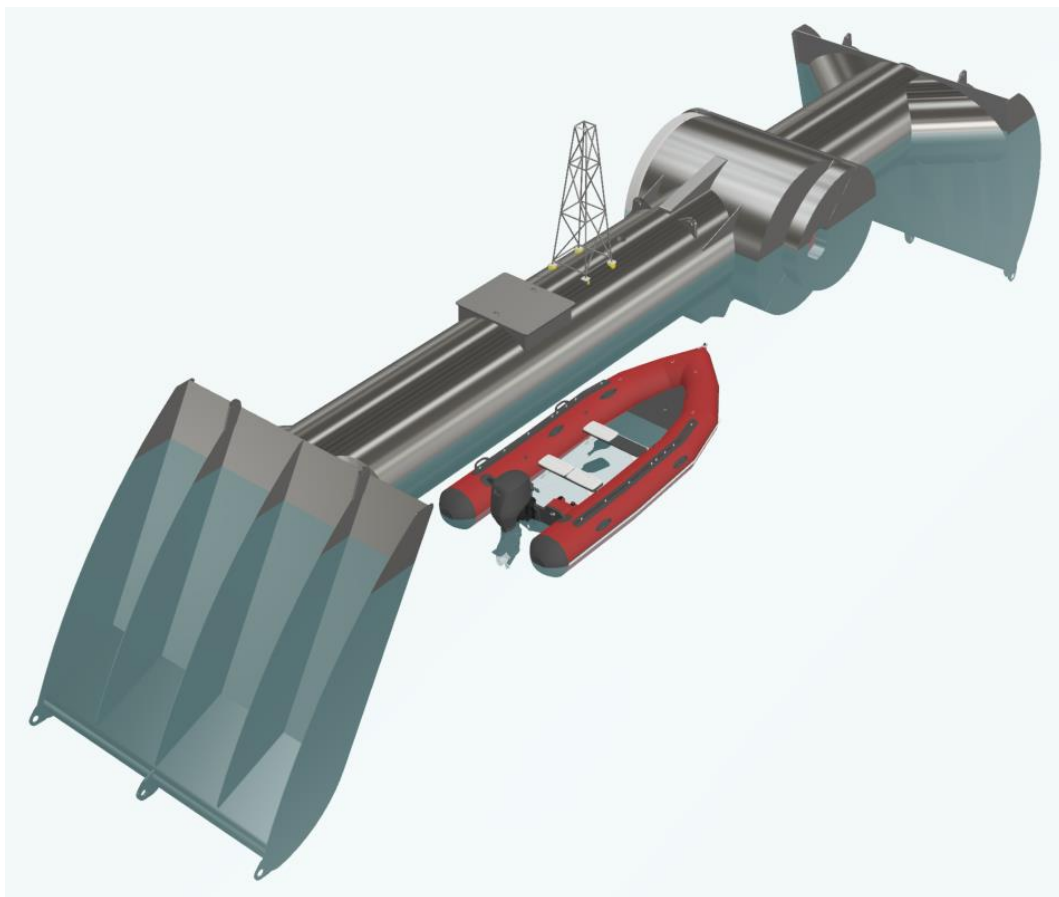
The M100P consists of two yellow painted steel hulls connected at a hinge through a pair of steel hinge pins. The key dimensions of the machine are given in Table 2. Figure 2-2 shows a visualisation of the machine on the pier. Figure 2-3 shows a visualisation of the machine deployed at sea; however, the mooring lines are not shown here. Note that in both figures, the machine will be painted yellow. Figure 2-4 gives the general arrangement of the machine.



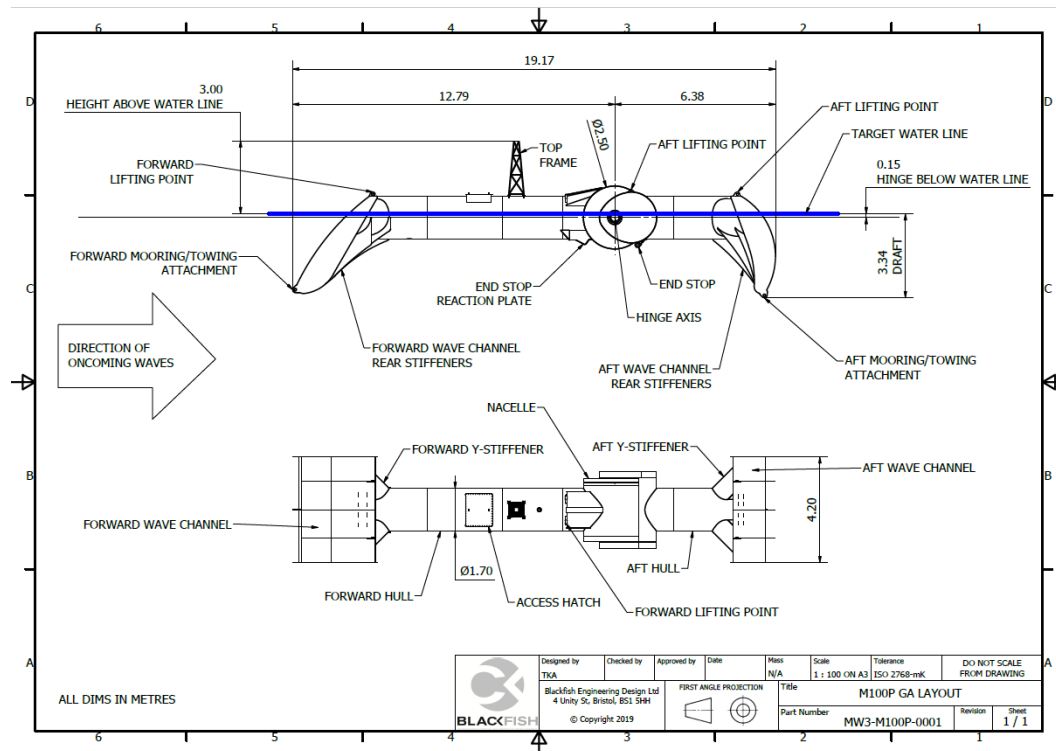
**Figure 2-2 M100P visualisation on pier.**







**Figure 2-3 M100P visualisation as deployed at sea.**



**Figure 2-4 M100P Drawing with dimensions**

**Table 2 Key dimensions of the M100P**

Dimension	Units	Value
Length overall	m	19.2
Beam	m	4.2
Draft	m	3.4
Mass	tonnes	37.9

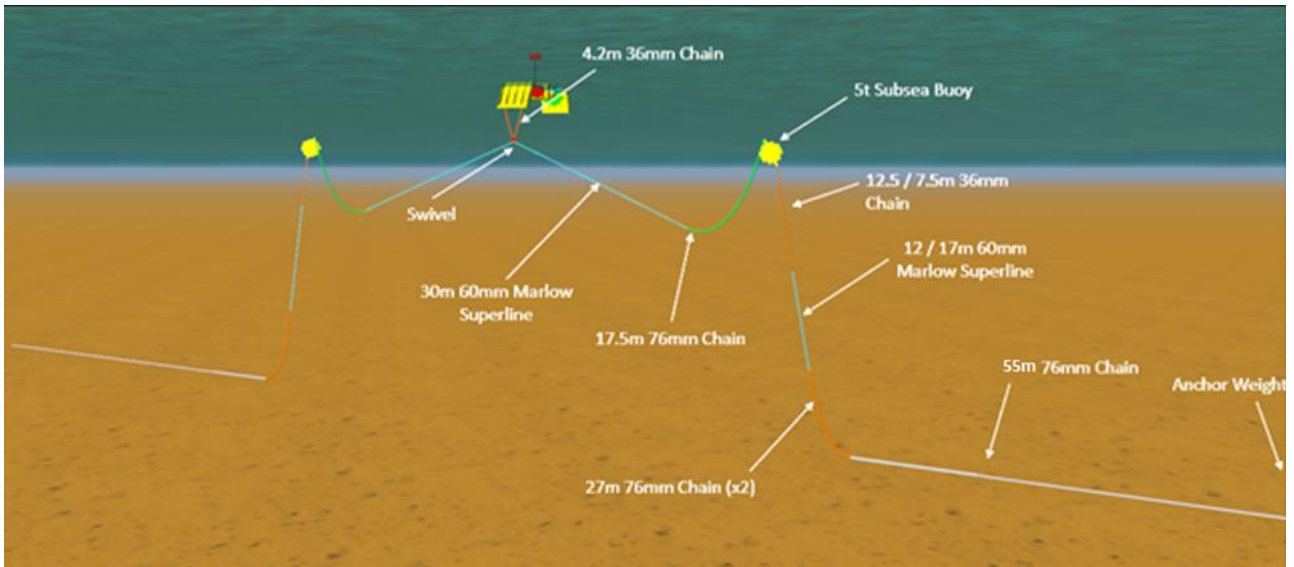
## Internal Systems

The rotation of the aft hull with respect to the forward hull drives a gearbox and then a generator. Power from the generator is then conditioned and used onboard the WEC to power local system. Power beyond that needed to power on-board systems is stored in 30 kWh of batteries. Once the batteries are fully charged, excess power is dissipated through an onboard dump resistor. Key onboard systems that use power include: the control, communications, cooling, instrumentation, and navigation lighting.

## Mooring System

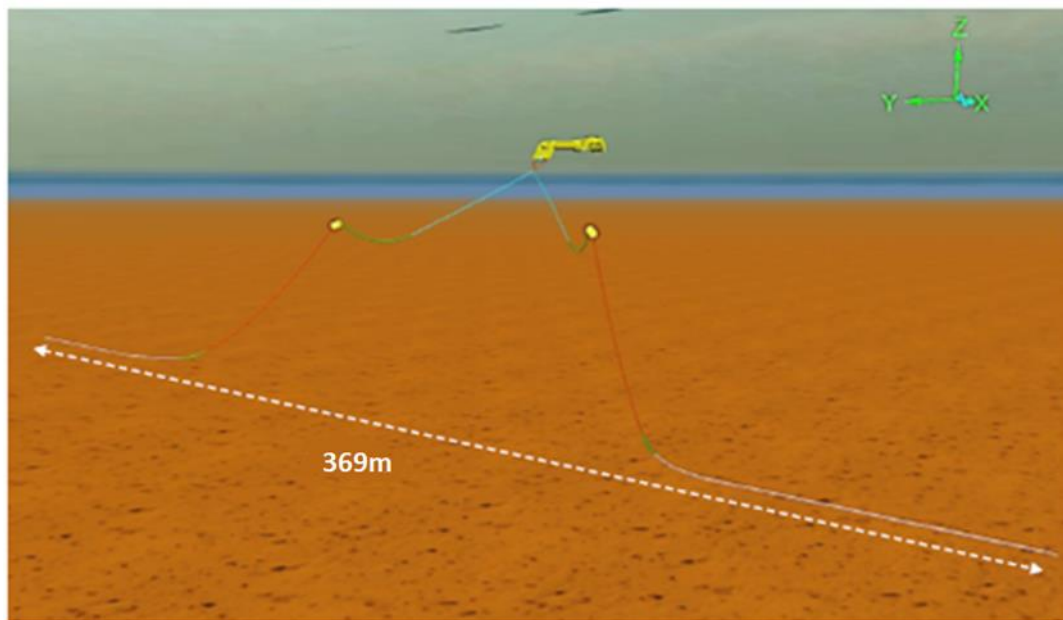
Figure 2-5 shows the construction of the mooring system. The system is made of 2 mooring lines, the mooring attachment points on the 2 legs are attached to a 4.2m bridle at the forward mooring point on the WEC.





**Figure 2-5 Mooring leg structure**

The distance between the end points of the mooring legs is shown in Figure 2-6.



**Figure 2-6 The WEC with Mooring Spread**

The final site footprint after optimisation in advance of deployment is represented in the As Built drawing in Figure 2-7.



When the WEC is not connected to the mooring system (i.e., prior to installation or during maintenance), the mooring system will be held in place by a surface buoy.

**HALO**

<b>HALO Dimensions</b>	<b>meters</b>
Length	9.5
Height	3.4
Width	1.7
Depth bellow surface	46.6-49.6







## 2.5 OPERATIONAL PLANS AND METHODOLOGIES

### 2.5.1 Construction and installation

The vessel spread required for installation is shown in Table 3. Further details of the vessels likely to be used for the deployment are provided in the Vessel Management Plan in Appendix B.

**Table 3 Vessels utilised for installation**

Vessel Type	Task
Multi Cat (x1)	Anchor and Mooring installation/removal. Device installation and removal. At-sea battery charging and power demonstration.
Rigid Hulled Inflatable Boat (RHIB) (x1)	At-sea visual inspection. Wave Rider installation and removal.



**Figure 2-11 Example vessel of Multi Cat**



**Figure 2-12 Example vessel of RHIB**

## Mooring installation

The installation phases are described below:

- preliminary phase: anchor and ground chain installation
- deployment phase 1: The Halo is transferred to site and connected with the umbilical and the mooring
- deployment phase 2: The device is towed to site and final mooring arrangements and hook-up are made.
- deployment phase 3: Scientific equipment for site monitoring installed on site
- deployment phase 4: ARV launched for missions

It is good practice to decouple where possible the installation of anchors from loadout, and this normally helps de-risk the project in terms of weather exposure.

Both concrete anchor blocks and chain clumps have been used as anchors to address the lack of chain available for hire, make safer and faster the deployment and minimise carbon footprint by re-using materials used in previous marine renewable projects. This anchor change was reviewed and approved under the existing TPV certificate issued for the deployment.

The synthetic mooring lines, anchors and ground chain were installed before the RSP system and buoyed off for easy pick up. Mooring design guidance states that synthetic lines should only be left on the seabed for temporary phases due to the perceived risk of sediment ingress which can cause internal abrasion. In reality modern ropes are well protected.

Prior to device installation and while the device is at quayside for maintenance, the mooring system will remain deployed and buoyed off to a surface/marker buoy.

## HALO installation

The HALO deployment has the following tasks:

- **Task 1** – Deploy Multicat mooring spread on site
- **Task 2** – Pre deployment survey with drop camera / ROV to ensure HALO landing position clear of any hazards.
- **Task 3** – Hook onto Multicat moorings, recover WEC mooring buoy and connect umbilical to cable clamp underneath buoy
- **Task 4** – Lower mooring buoy and lay away towards HALO deployment site, connecting umbilical buoyancy where required
- **Task 5** – Connect rigging to HALO and overboard with crane
- **Task 6** – Lower HALO to seabed, release rigging
- **Task 7** – Lay AUV umbilical on seabed with pick up system for ROV
- **Task 8** – Recover mooring spread

## Device and umbilical installation

The installation of the Halo is completed in 1 day and connecting the Blue X with the Halo and mooring is completed within 1 day. It is expected that the WEC device can be installed in conditions of  $H_s < 1.5\text{m}$ .

With the Nylon ropes pre- installed with anchors and left onsite while waiting for the system installation, the installation process is:

- a. The WEC is towed onsite with pennants<sup>1</sup> on
- b. The mooring is retrieved from starboard surface buoys
- c. The mooring is connected to preinstalled pennant<sup>1</sup> on WEC

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<sup>1</sup> The mooring pennant is a short length of line that forms part of the mooring system near the WEC.



- d. This is repeated for the port surface buoy whilst the cable clamp is also recovered and the umbilical connection is made and tested and deployed

## HAUV Installation

The AUV docking station has been incorporated with the Halo, thus for the AUV launch a RHIB can transit to site, and AUV can be launched by hand and navigate its way to the seabed and its docking station.

### 2.5.2 Device testing

The RSP system testing will consist of running all equipment under normal operating conditions at the deployment site, collecting data with onboard instrumentation, logging that data, and sending some of it back to a control centre on shore via wireless signals. Onboard instrumentation will measure parameters needed to assess power absorption, engineering quantities like loads, and to monitor the health of the machine.

### 2.5.3 Maintenance

The device has been designed so that regular maintenance is not required. However, because it is a prototype, it is anticipated that during performance testing, visual inspection will be performed approximately every 2 weeks. A given test-maintenance cycle occurs every 2 weeks at sea when the weather is suitable.

Additional unplanned maintenance may also be necessary. For unplanned and/or heavy maintenance, the WEC will be disconnected from its mooring and umbilical connection and towed to the appropriate maintenance port.

Maintenance activities will take place across three different locations, depending upon nature and duration of the activity:

- **On Station:** As much routine and responsive maintenance as possible will take place at the proposed mooring location.
- **Sheltered Mooring:** There is a designated sheltered mooring location nearby in Holm Sound where the device will be moored temporarily where a sheltered sea state is required for specific maintenance activities.
- **Hatston Quay:** For maintenance activity requiring the device to be lifted out of the water, Hatston Quay in Kirkwall will be used.

### 2.5.4 Monitoring

During deployment, the device will be monitored 24/7 as required by the Mocean Team using the Graphic User Interface ("GUI") and its related alarms. In addition to the GUI, the WEC also includes an AIS transponder which can be monitored in case of communications failure with the device. An emergency response plan is in place which identifies contacts, contractors, process and procedures for responding to any unplanned excursion of the device. Similarly an Emergency Cooperation Plan has been agreed with the MCA and the Police.

### 2.5.5 Decommissioning

Decommissioning will involve the removal of the RSP system and all associated equipment. This will be a reverse of the installation procedures outlined above. The RSP system is planned to be removed from site by a Mulit Cat vessel in 2 days, and its mooring lines and anchors, and the scientific equipment are planned to be removed from site by a Multi Cat vessel in 2 further days.



### 3 ENVIRONMENTAL ASSESSMENT AND MANAGEMENT PLAN

Potential environmental impacts and residual effects that could arise from the proposed activities set out in section 2 were considered in the preparation of the environmental mitigation, monitoring and management plan presented. This involved a proportionate consideration of the potential magnitude of impacts of the Project on the existing environment. Spatial extent, scale (size, amount, volume and intensity), duration, frequency and timing, reversibility and sensitivity of receptors, are all factors for consideration of the magnitude of impact. Professional expert judgement was used to determine the likely significance of any residual effects.

The results of the assessment of potential residual impacts and proposed mitigation/monitoring measures are outlined and described within the context of the proposals in Table 4.



**Table 4 Residual effects and mitigation/monitoring measures**

Potential impact	Receptor	Assessment of residual effect(s)	Proposed mitigation and monitoring measure(s) and reporting
<b>All phases including construction and installation, operation and maintenance and decommissioning</b>			
Disturbance from support vessel activity – vessel noise and presence	Cetaceans Seals Basking sharks Marine birds (seaducks, divers)	<p>The M100P, mooring system and subsurface system will be installed using one standard multi-cat work vessel, assisted by a RHIB. Installation activities will be completed over two days.</p> <p>Maintenance and inspection will be performed approximately every two weeks throughout testing. It is possible that unplanned onsite maintenance will occur.</p> <p>There is one designated seal haul-out in the wider vicinity of the Test Site at the island of Copinsay (see Appendix figure B.3).</p> <p>The Vessel Management Plan will include measures to ensure a minimum approach distance is adhered to when passing designated seal haul-outs.</p> <p>No significant effects on any sensitive species are expected from this low level of vessel activity.</p>	<p><b>Adherence to SMWWC</b></p> <p>Relevant measures from the Scottish Marine Wildlife Watching Code (SMWWC) (SNH, 2017) will be implemented by Mocean Energy and all marine contractors. These will include:</p> <ul style="list-style-type: none"> <li>• Speed will be reduced to 6 knots when any marine mammals or birds are sighted within or near to transit routes, where consistent with crew and navigational safety and the completion of constrained operations.</li> <li>• A steady speed and course will be maintained where possible if a marine mammal approaches a project vessel.</li> <li>• Care will be taken to avoid splitting up groups and mothers and young.</li> <li>• Minimum approach distances (as stated in the SMWWC) for vessels on approach to marine mammals and birds will be adhered to, although this may be varied according to species and circumstance. Specifics will be agreed with SNH and listed in the CEMD and implemented.</li> <li>• Sudden unpredictable changes in speed, direction and engine noise will be avoided to avoid disturbance to any marine mammals in the vicinity.</li> <li>• Rafts of birds will not be intentionally broken up or flushed.</li> <li>• During the seabird breeding season (April to August inclusive) vessel transit corridors will be at least 50 m from shore in the vicinity of cliff-nesting seabirds to avoid disturbance.</li> </ul> <p><b>Vessel Management Plan</b></p> <p>A Vessel Management Plan has been developed which will be implemented to help ensure a minimum approach distance is adhered to when passing designated seal haul-outs (refer to draft VMP in Appendix B).</p> <p><b>Reporting</b></p> <p>The Vessel Management Plan will be maintained throughout the project. Any changes will be agreed in advance with Marine Scotland.</p>





Potential impact	Receptor	Assessment of residual effect(s)	Proposed mitigation and monitoring measure(s) and reporting
Introduction of marine non-native species (MNNS) (via vessels, devices or other equipment)	Various	The WEC (which was previously deployed in Scapa Flow, Orkney) and ancillary equipment will be towed from Hatston Pier to the site for final deployment using a local operator in Orkney. Therefore, there is no potential for the introduction of MNNS via vessels used to tow the devices and from the device itself.	No specific mitigation is proposed in relation to this impact during the deployment and operation of the M100P WEC system.
Habitat creation and Fish Aggregation Device (FAD) effects due to introduction of new structures	Benthic species and habitats Fish and shellfish (gadoids and crustaceans)	It is likely that fish will aggregate around the M100P WEC device. No significant effects are anticipated from the deployment of a single hinged raft WEC device of this type.	No specific mitigation is proposed in relation to this impact during the deployment and operation of the M100P WEC device.
<b>Construction and installation</b>			
Seabed disturbance from installation of the mooring system.	Benthic species and habitats Demersal fish and shellfish	During installation of the mooring system and subsurface system there is potential for minimal disturbance to seabed habitat and to benthic species including demersal fish and shellfish. No drilling is proposed with respect to the mooring system installation therefore potential disturbance is considered to be highly localised and temporary. A benthic survey carried out in September 2019 confirmed that the deployment area is consistent with a previous survey conducted by SNH, which reported the presence of SS.SSa.CFiSa to the east of Holm Sound, where there were few signs of infaunal life and a sparse epifaunal	No specific mitigation is proposed in relation to this impact during the deployment and operation of the M100P WEC system.



Potential impact	Receptor	Assessment of residual effect(s)	Proposed mitigation and monitoring measure(s) and reporting
		community mainly composed of widely scattered echinoderms. Where there was hard rock substrates observed in the study, a low-diversity encrusting community of serpulid worms, bryozoans, coralline algae and <i>E. esculentus</i> were found and therefore the rocky habitat was assigned to the CR.MCR.EcCr.FaAlCr biotope <sup>2</sup> .	
Underwater noise from mooring system installation leading to disturbance	Cetaceans Seals Basking sharks	The preferred mooring solution is drag embedment anchors or gravity-based foundations therefore no drilling is required.	No specific mitigation is proposed in relation to this impact during the deployment and operation of the M100P WEC system.
Operation and maintenance			
Displacement of marine mammals, basking sharks and seabirds due to the presence of the array	Marine mammals, basking shark and seabirds	<p>The introduction of new structures into the environment has the potential to displace marine mammals, basking sharks and seabirds from the immediate surrounding area.</p> <p>The presence and operation of the M100P WEC system and its associated mooring system/subsurface systems with an overall footprint of 0.05 Km<sup>2</sup> is highly unlikely to adversely affect marine through mammals, basking shark and seabirds which will still be able to inhabit and pass the area.</p>	No specific mitigation is proposed in relation to this impact during the deployment and operation of the M100P WEC system.
Underwater noise from WEC operation leading to disturbance	Cetaceans Seals Basking sharks	There is no risk of injury or death from underwater noise generated by a single operating WEC and subsea system.	No specific mitigation or monitoring is proposed in relation to this impact during the deployment and operation of the M100P WEC system.

<sup>2</sup> Mocean Site C Benthic and VMADCP Survey Report (Aquatera 2019)



Potential impact	Receptor	Assessment of residual effect(s)	Proposed mitigation and monitoring measure(s) and reporting
		No anticipated significant impacts are expected from the M100P WEC system.	
Entanglement in mooring lines or cables leading to injury or death	Cetaceans Basking shark	<p>A study commissioned by Scottish Natural Heritage (SNH) concluded that moorings associated with marine renewable energy devices are unlikely to pose a major threat in terms of entanglement risk to cetaceans and basking sharks due to the size and mass of the moorings. However, there is a greater risk for large baleen whales<sup>3</sup> due to their large size and foraging habits (Benjamins <i>et al.</i> 2014).</p> <p>There is a very low likelihood of occurrence of large baleen whale species at the site with humpback whale a very occasional visitor to Orkney waters (Evans <i>et al.</i>, 2010)</p> <p>The presence of a single WEC and associated 2 taut nylon mooring lines, covering a small footprint (0.05 Km<sup>2</sup>) is not anticipated to result in any significant entanglement risk for large baleen whale species.</p>	<p>No specific mitigation or monitoring is proposed in relation to this impact during the deployment and operation of the M100P WEC system.</p> <p><b>Reporting</b></p> <p>Any notable events will be recorded and reported to Marine Scotland no later than 24 hours after observation.</p>
Presence of WEC and associated infrastructure leading to barrier effects	Cetaceans Seals Basking sharks	The presence of a single M100P WEC and associated infrastructure is not expected to result in any significant barrier effects for marine mammals or basking sharks.	No specific mitigation or monitoring is proposed in relation to this impact.
Changes to hydrodynamics and sediment regime	Hydrodynamic and physical processes	The presence of a single M100P WEC and associated infrastructure is not expected	No specific mitigation or monitoring is proposed in relation to this impact.

<sup>3</sup> Such as the fin whale *Balaenoptera physalus*, or humpback whale *Megaptera novaeangliae*.



Potential impact	Receptor	Assessment of residual effect(s)	Proposed mitigation and monitoring measure(s) and reporting
		to result in any significant changes to hydrodynamics and sediment regime.	
Electromagnetic Field (EMF) effects	Diadromous fish, gadoids and elasmobranchs	EMF effects are not expected to be a significant issue for the M100P WEC system as there is no umbilical connection from the device to shore and therefore there are no significant length of electrical cables associated with the device.	No specific mitigation or monitoring is proposed in relation to this impact.
Presence of concrete anchor blocks leading to seabed habitat disturbance/loss or changes to seabed habitat	Benthic species and habitats	Minimising the footprint of anchors/foundations could reduce effects on sensitive habitats, however the size of anchors/foundations is integral for the safe and optimal operation of the equipment. No anticipated significant impacts are expected from the presence of the anchor blocks due to small footprint in the licensed area.	No specific mitigation or monitoring is proposed in relation to this impact.



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## 5 APPENDICES

### APPENDIX A APPENDIX A: PROJECT PROGRAMME

Activity	1 02/23	2 03/23	3 04/23	4 05/23	5 06/23	6 07/23	7 08/23	8 09/23	9 10/23	10 11/23	11 12/23	12 01/24	13 02/24	14 03/24	15 04/24	16 05/24	17 06/24	18 07/24	19 08//24	20 09/24
Mooring Installation	<b>X</b>																			
RSP system Installation	<b>X</b>																			
Testing		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>		<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>						
Maintenance – On Station			<b>X</b>		<b>X</b>		<b>X</b>		<b>X</b>		<b>X</b>		<b>X</b>							
Maintenance – Sheltered Mooring <sup>4</sup>																				
Maintenance – Hatston Quay <sup>5</sup>						<b>X</b>									<b>x</b>					
Device & Mooring Removal															<b>X</b>					
Contingency <sup>6</sup>																<b>x</b>	<b>x</b>			

<sup>4</sup> Sheltered mooring maintenance as and if required

<sup>5</sup> Temporary recovery to Hatston Quay assumed due to current 10107 marine licence requirement to recover by 30/06/2023

<sup>6</sup> Assuming that offshore site will need to be cleared 3 months prior the extended licence expiry

## APPENDIX B VESSEL MANAGEMENT PLAN (VMP)

### B.1 INTRODUCTION

This VMP details the anticipated type and number of vessels that will be used during the construction and installation, maintenance and decommissioning of the M100P at the Test Site. It also highlights the likely ports and transit routes that will be used during all phases of the deployment.

### B.2 VESSEL DETAILS

The selection and contracting of vessels is primarily driven by market conditions, vessel availability and ultimately, cost. Therefore, the actual vessels will be selected near to the time of works. The developer will confirm the project vessel spread at the earliest possible opportunity prior to works commencing as required (as per normal maintenance activities). The vessels presented in the following figures and Appendix Table B.1 are indicative of the vessels likely to be used.



**Appendix Figure B.1**    **Example Multi Cat vessel**



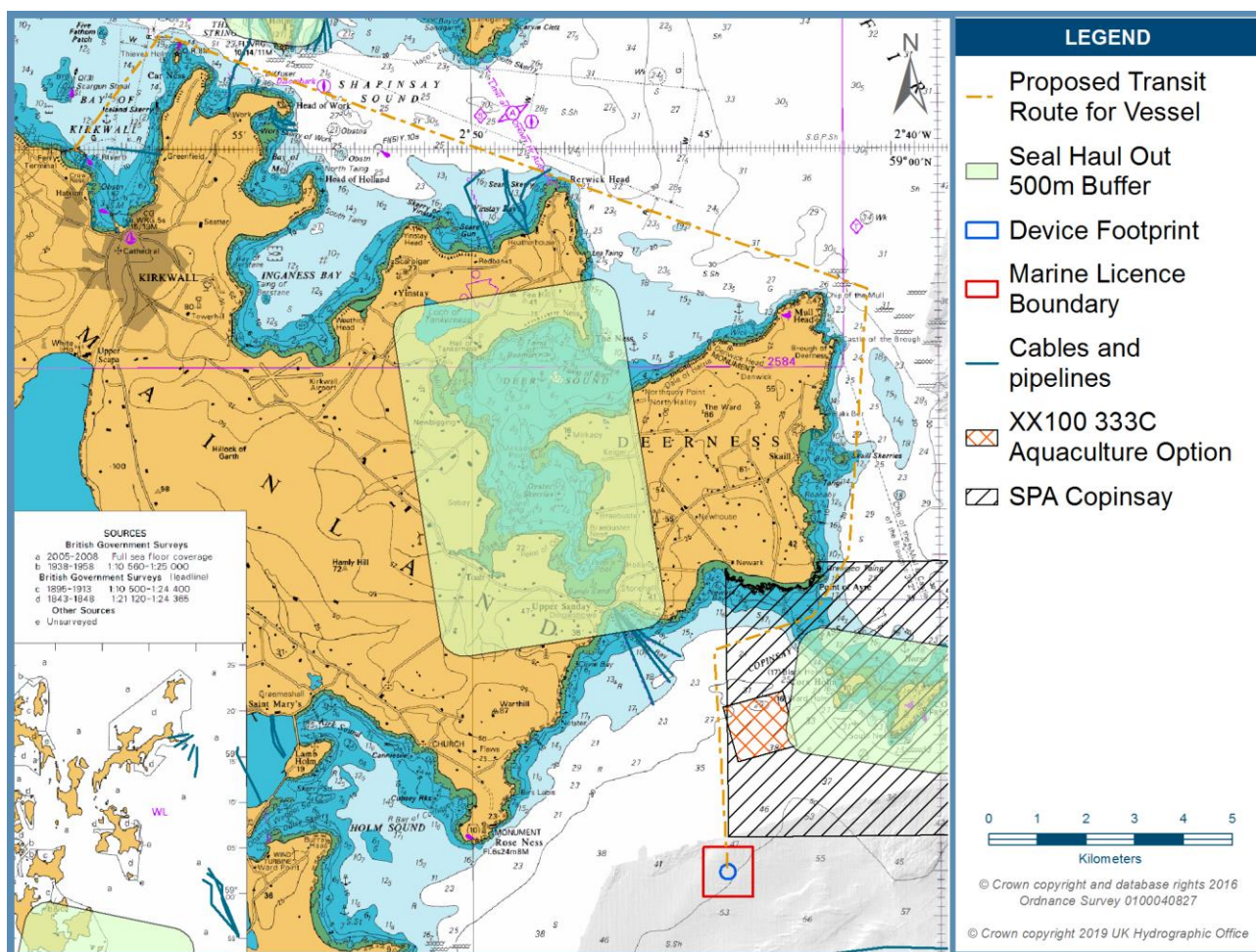
**Appendix Figure B.2 Example Rib vessel**

**Appendix Table B.1 Vessel information (FOR MAIN VESSELS ONLY)**

	<b>MV C-FENNA</b>	<b>MV C-ODYSSEY</b>	<b>GREEN ISLE</b>
Flag state	UK	UK	UK
Port	Kirkwall	Kirkwall	Stromness
Year of build	2013	2011	2015
Type	Neptune Eurocarrier 2611	Multiworker Twenty6	Damen
Length	26.5 m	26 m	27.7 m
Beam O.A.	11 m	10.5 m	12.5 m
Draught	2.6 m	2.5 m	2.9 m

### **B.3 VESSEL ROUTES**

Indicative vessel transit routes between Hatston Pier and the test site are presented in Appendix figure B.3. The same route will be used for all phases of the deployment. Vessels will as far as possible avoid passing within 500m of any identified seal haul-out site when in transit. Seal haul-outs with a 500m buffer and suggested vessel routes in close proximity to the test site are provided in Appendix figure B.3.



**Appendix figure B.3 Transit Route**

A designated Marine Operations Manager/Marine Superintendent is responsible for the discharge of relevant licence conditions whilst at sea. This will be Mocean Energy's Operations Manager, Yan Gunawardena.



## APPENDIX C NAVIGATION AND LIGHTING PLAN

The navigation and lighting arrangements are as follows:

1. Main WEC structure above waterline painted yellow
2. A mast fixed to the WEC. At the top of the mast at a minimum height above waterline of 3.0 metres, a yellow flashing light with a characteristic of: Flash 1 every 5 seconds with a visibility from all directions and a nominal range of 3 nautical miles
3. A passive radar reflector fixed on the mast
4. Close to the top of the mast below the light is a yellow "St Andrews" cross special mark. The bars of the cross are at least 75 cm long x 15 cm wide
5. An AIS transmitter appropriate for an AtoN (Aid to Navigation) transmitting a Type 21 message

Note that there may be a requirement from the regulator for additional buoyage in the form of Cardinal marks and/or Special marks to mark the surrounding area.

### Navigation warnings and communications plan

Navigation warnings will be communicated through Notices to Mariners (NtoM) to inform mariners of circumstances which affect the safety of navigation. It is the responsibility of the developer (Mocean Energy) to ensure that Notices to Mariners are issued. NtoM's will be disseminated as widely as possible and should include at least the following recipients:

- UK Hydrographic Office
- Maritime and Coastguard Agency (MCA) through the local MRCC (Shetland)
- Northern Lighthouse Board (NLB)
- Kingfisher Fortnightly
- Orkney Islands Council Harbour Authority
- RYA
- Orkney Fisheries Association
- Orkney Fishermen's Society
- Scottish Fisheries Federation

Notice to Mariners must be issued well in advance of any operations being undertaken to allow promulgation through the appropriate channels, and for the marine installation phase the NtoM may be required to be published in the local newspaper for at least two weeks prior to installation.

The NtoM should contain the following information:

- Details of works program including period & purpose
- Duration and start and stop dates
- Positions of maximum extent of projected works
- Details of lights, buoys and other navigational aids
- Proposed routes of vessels involved in installation (from port to site)
- Changes to existing routing measures/vessel movement
- Details of any areas to be avoided
- Vessels not involved in works with the device should avoid the area.
- Proposed positions of devices and other associated features on completion of works





- Instructions to vessels
- That vessels involved in the works will keep a listening watch on VHF Channel 16

The NtoM will be specific and kept concise bearing in mind that the information will be broadcast on radio by the local Harbour Authority.

NtoM's will be issued 14 days prior to the commencement of marine works. Once the installation is completed then the NtoM will be cancelled and an amended NtoM will be issued simultaneously to cover the operating period. Any further significant changes which may affect navigation will be dealt with by cancelling and re-issuing a NtoM such as the decommissioning phase. On completion of decommissioning and the site is cleared the NtoM will be cancelled.



## APPENDIX D    COMMITMENTS TABLE/REGISTER

Please refer to [MOE-RSP-2020-Commitments register.xlsx](#)



## **APPENDIX E      RELEVANT MARINE LICENCE CONDITIONS**

Please refer to [MOE-RSP-2020-Commitments register.xlsx](#)

